

A NOTE ON THE ACTION OF LITHIUM CHLORIDE ON MOSQUITO LARVAE

BY
J. W. S. MACFIE

(Received for publication 14 November, 1922)

It is well known that larvae of certain mosquitoes, e.g., *Stegomyia fasciata*, are intolerant of common salt. Other chlorides act similarly, some of them very powerfully, as is shown in Table I,

TABLE I.

The number of hours required to kill all larvae of *Stegomyia fasciata* in various solutions of chlorides.

Salt	Percentage of anhydrous salt which = 1.0% Cl	Cl 1.0%	Cl 0.75%	Cl 0.5%	Cl 0.25%
ZnCl ₂	1.92	3 hours	3 hours	7 hours	7 hours
BaCl ₂	2.93	4 hours	5 hours	<24 hours	<24 hours
LiCl	1.21	5 hours	7 hours	>7 hours	<24 hours
NaCl	1.65	6 hours	<24 hours	>48 hours	>72 hours
CaCl ₂	1.56	6 hours	>24 hours	>48 hours	>72 hours
MgCl ₂	1.34	<24 hours	>24 hours	>48 hours	>72 hours

which summarises a series of preliminary experiments on the action of these salts carried out by Mr. R. Simmons, which I am permitted by him to quote. Additional experiments were made subsequently with lithium chloride and *Stegomyia fasciata*. In one of these, five larvae and one pupa were placed in a 1.2 per cent. solution of LiCl; within four hours all the larvae were dead, but the pupa appeared to be unaffected. In three others, twenty-seven larvae were placed in a 0.3 per cent. solution of LiCl in the afternoon; all were dead by next morning, that is within sixteen or seventeen hours.

During the experiments it was noted that lithium chloride not only killed the larvae of *Stegomyia fasciata*, but also produced a peculiar effect on them, causing them to writhe about at the bottom of the jars, apparently unable to rise to the surface, and to become entangled with one another, usually by the mouth brushes. These effects were observed even in the weakest solutions used.

As lithium chloride appeared to have a very powerful effect on the larvae, further experiments were carried out to determine the limits of the injurious action.

Culex fatigans. The larvae were placed in glass jars (five in each) containing 100 c.c of the lithium chloride solution. The jars were covered with glass plates, stood on the laboratory bench, and examined morning and afternoon at about 9 a.m. and 5 p.m. The solutions used were 0.3, 0.15, 0.06, 0.03, and 0.015 LiCl per cent. The results are summarised in Table II.

TABLE II.

The effect of solutions of Lithium chloride on the larvae of *Culex fatigans*.

Day of the experiment	Percentages of LiCl in the solutions				
	0.3	0.15	0.06	0.03	0.015
1. a.m.	Experiments started				
p.m.	Three dead	All affected	One affected	No visible effect	No visible effect
2. a.m.	All dead	All dead	Three affected	No visible effect	No visible effect
p.m.	—	—	All sluggish	No visible effect	No visible effect
3. a.m.	—	—	Three almost dead	No visible effect	No visible effect
p.m.	—	—	Two just alive	No visible effect	No visible effect
4. a.m.	—	—	—	No visible effect	No visible effect
p.m.	—	—	One alive	No visible effect	No visible effect
5. a.m.	—	—	All dead	No visible effect	No visible effect
p.m.	—	—	—	No visible effect	No visible effect

Exactly similar experiments were carried out with larvae of *Stegomyia fasciata* and *Anopheles costalis*. Without entering into details, it may be said that the results also were similar, all, or practically all, the larvae dying in the 0.3 and 0.15 per cent. solutions within twenty-four hours, and in the 0.06 per cent. solution

within two or three days. In the 0.03 and 0.015 per cent. solutions the larvae, especially when young, were also affected: in an experiment with almost fully grown larvae of *S. fasciata*, for example, only two out of ten completed their development in the former solution, and two out of seven in the latter, whereas in the control jar no casualties occurred. In the case of *S. fasciata*, entanglement of the larvae by their mouth brushes and other setae was repeatedly, but not invariably, observed.

It is worthy of note that the larvae of *Mansonioides africanus*, which live attached to the roots of the water-weed *Pistia stratiotes*, do not escape the action of lithium chloride. A small plant of *Pistia stratiotes* with larvae attached to it was placed one afternoon in a jar containing 100 c.c. of a 0.3 per cent. solution. By the next morning, that is within eighteen hours, all the larvae had left the roots of the plant and were dead.